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imagery analysis report

Surface-to-Air Missile Activity Sub-Saharan Africa (S)

Secret

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SURFACE-TO-AIR MISSILE ACTIVITY, SUB-SAHARAN AFRICA (S)

INTRODUCTION

1. (S/D) Surface-to-air missile (SAM) activity has been	identified on satellite imagery with
the military forces of 11 countries in sub-Saharan Africa has	been identified on satellite imagery.
This report summarizes the current status and recent activity	of these SAM systems and provides
location maps, tabular listings of SAM-associated facilities,	and photographs of representative
facilities. Information contained in this report is current as of	

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BACKGROUND

- 2. (S/D) The Soviet Union has been the major supplier of SAM equipment to Sub-Saharan Africa, and ten of the 11 countries with SAM systems possess Soviet-built systems (Table 1 and Figure 1). While the first observation of SAM equipment in Sub-Saharan Africa was in April 1971, most of the countries have received these systems since 1976. Before 1976, only Sudan and Somalia possessed SAM equipment.
- 3. (S/D) The Soviets have exported four SAM systems to this region—the SA-2, SA-3, SA-6, and SA-7. The SA-2, a medium-altitude SAM, is presently deployed to three countries—Ethiopia, Somalia, and Sudan. This was the first SAM system of any type to be delivered to sub-Saharan Africa, having been initially identified in Sudan in April 1971. The SA-3 is a low-altitude SAM that is currently deployed to seven countries in this region—Angola, Ethiopia, Mali, Mozambique, Somalia, Tanzania, and Zambia. The SA-3 system was first observed in Sub-Saharan Africa in October 1976 when sites were identified in Tanzania. The SA-6 is a low-altitude mobile SAM that has been deployed with the military forces of one country in this region—Tanzania. The SA-6 was first identified in Tanzania in January 1979. Additional detail on the deployment of the SA-2, SA-3, and SA-6 systems is given in this report in the sections describing the SAM deployment within each country.
- 4. (S/D) The SA-7 is the most widely deployed Soviet SAM system in Sub-Saharan Africa. This low-altitude, portable SAM has been identified in eight countries in the region—Angola, Chad, Congo, Ethiopia, Mozambique, Sudan, Tanzania, and Zambia. The SA-7 is a man-transportable system that can be fired from completely unprepared launch positions. However, revetted firing sites have been identified with this system and can be used to confirm on satellite imagery the presence of the SA-7 within a particular country. These revetted firing sites are usually observed in an area where the SA-7 forms part of the air defense network for a permanent installation such as an airfield or barracks area. Revetted sites have also been identified for use in training personnel on SA-7 firing procedures. Figure 2 shows personnel undergoing training on the SA-7 system at a training site near Nacala Airfield in Mozambique. Support towers for a probable moving target silhouette are adjacent to this training site. Because of the small size of the SA-7 and the fact that a prepared launch site is not required, satellite imagery cannot provide a complete picture of SA-7 deployment. Therefore, this report does not describe SA-7 deployment patterns in detail. Table 1 indicates where SA-7 firing sites have been identified.
- 5. (S/D) In addition to the four Soviet systems, two Western-produced SAM systems have been identified in Sub-Saharan Africa. The French Crotale, a mobile low-altitude SAM system,

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has been observed in South Africa since March 1976. In South Africa this system is referred to as the Cactus system. The British Tigercat, also a mobile, low-altitude SAM system, has been identified in two countries in the region—South Africa and Zambia. The Tigercat system was initially identified in Sub-Saharan Africa in April 1976 when it was observed in South Africa. Additional detail on the deployment of the Crotale (Cactus) and Tigercat systems is contained in this report in the sections describing the SAM deployment within each country.

BASIC DESCRIPTION

Angola

and Figure 3). The first indicator of SA-3 deployment in Angola was the identification of SA-3-related construction in the vicinity of Lubango (Sa Da Bandeira) in early May 1979. Three launch sites and one support facility were observed under construction in this area at that time. The first identification of SA-3 equipment took place in July 1979, when SA-3 canisters and canister trans-	
porters were on a train at Sa Da Bandeira Railroad Yards and Shops South In April 1980, SA-3 equipment was initially identified in the Mocamedes area and in June 1980, SA-3 equipment was observed for the first time in the Matala area. Presently, one launch site and one SAM support facility have been identified in the Mocamedes area, and three launch sites (only two occupied) have been identified in the Matala area.	25X1
Ethiopia	
7. (S/D) Three SAM systems—the SA-2, SA-3, and SA-7—have been delivered to Ethiopia by the Soviets since early 1978 (Table 3 and Figure 4). The SA-3 was the first system to be seen in country, with site construction identified for the first time near the city of Aseb on SA-3 equipment was observed six days later at Aseb Port Facilities , where missile canisters and canister transporters were identified. Since then a total of five SA-3 related facilities have been identified in Ethiopia—three launch sites and one support facility near Aseb and one launch site at Diredawa.	25X1 25X1
8. (S/D) The first indicator of the export of the SA-2 system to Ethiopia was the sighting of SA-2 sustainer canisters in the hold of a Soviet Sosnogorsk-class merchant ship at Aseb Port Facilities on 0n the first SA-2 launch site was observed south of Addis Ababa near Harar Meda Airfield Since then a total of five SA-2-related facilities have been identified in Ethiopia—one launch site at Harar Meda, two launch sites at Jijiga, and one launch site and one support facility near Addis Ababa. Figure 5 shows one of the two launch sites at Jijiga.	25X1 25X1
Mali	
9. (S/D) The only country in West Africa to which SAM equipment has been deployed is Mali, which has received the Soviet SA-3 system (Figure 6). SA-3 equipment was identified in	
Guinea at Conakry Port Facilities from December 1977 through February 1978.	25 X 1

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It was observed in a transshipment area and was probably the same equipment that was later

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identified in Mali at Bamako/Ville Airfield training site had been set up adjacent to a parking apron on the west side of the airfield. This site, Bamako SA-3 SAM Site Figure 7), is field deployed and consists of three four-rail launchers and a LOW BLOW tracking and guidance radar. Support equipment—including SA-3 missile canisters, canister transporters, and missile transporters—is frequently observed on the adjacent parking apron. This is the only location in Mali where the SA-3 has been identified. Mozambique	25X1 25X1
•	
10. (S/D) Two SAM systems, the SA-3 and SA-7, have been observed in Mozambique (Table 4 and Figure 8). The first indicator of impending SA-3 deployment was the identification of an SA-3 site under construction near Maputo on SA-3 equipment was observed in country for the first time on Since then five SA-3 facilities—four launch sites and one support facility—have been identified in Mozambique. All of these installations are near Maputo. For additional information on the deployment of the SA-3 to Mozambique, refer to the related document referenced in this report.	25 X 1 25 X 1
Somalia	
11. (S/D) Somalia possesses the most extensive SAM network in sub-Saharan Africa. This network is made up of 13 active facilities and employs the Soviet SA-2 and SA-3 missile systems (Table 5 and Figure 9). The SA-2 was the first system to be identified in Somalia when SA-2 equipment was observed at a support facility near Mogadiscio on Eight active installations (seven launch sites and one support facility) are now associated exclusively with the SA-2 system. The SA-3 was first observed in Somalia on near Mogadiscio. Three SA-3 launch sites have been identified in Somalia. In addition, two SAM support facilities which serve both the SA-2 and SA-3 systems have been identified in country.	25X1 25X1
12. (S/D) The Somalian SAM network presently provides protection to four areas. Mogadiscio is protected by two SA-2 and one SA-3 launch batteries. Berbera and Hargeisa are each protected by two SA-2 launch batteries. One SA-2 and two SA-3 launch batteries are presently deployed in the vicinity of Uanle Uen.	
South Africa	
13. (S/D) Two SAM systems, the Tigercat and the Crotale (Cactus), have been identified in South Africa (Figure 10). Both of these systems are mobile and are presently in storage at Waterkloof Airfield The French-designed Crotale (Cactus) was identified for the first time in country on in a storage area at Waterkloof Airfield. Less than one month later, on a second SAM system was identified for the first time in South Africa. On that date, British Tigercat launchers were in the same storage area at Waterkloof. Neither of these systems appears to be active, since the equipment has remained in storage.	25X1 25X1 25X1
Sudan	
14. (S/D) Two SAM systems, the SA-2 and the SA-7, have been observed in Sudan (Figure (Continued p. 6)	

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Table 1. Countries with SAM System, Sub-Saharan Africa (Keyed to Figure 1)

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		Soviet	Weste	rn		
Country	SA-2	SA-3	SA-6	SA-7	French Crotale (Cactus)	British Tigercat
Angola	_	Initial deployment Jul 79	_	Yes		
Chad	-	_	_	Yes	_	_
Congo	_	_	_	Yes	_	_
Ethiopia	Initial deployment May 78	Initial deployment Feb 78		Yes	_	_
Mali	_	Initial deployment Mar 78	_	_	_	
Mozambique	_	Initial deployment Dec 78	_	Yes	_	_
Somalia	Initial deployment Mar 74	Initial deployment Sep 77	_	_	_	_
South Africa	_		_	_	Initial deployment Mar 76	Initial deploymen Apr 76
Sudan	Initial deployment Apr 71		_	Yes	_	_
Tanzania	_	Initial deployment Oct 76	Initial deployment Jan 79	Yes	_	_
Zambia	_	Initial deployment Jul 80	_	Yes	—	Initial deploymen Apr 79

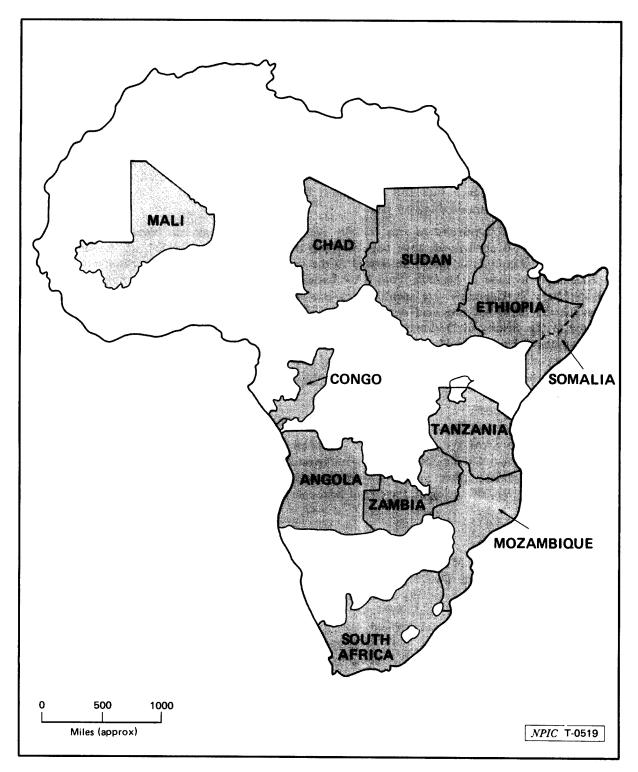


FIGURE 1. SAM DEPLOYMENT, SUB-SAHARAN AFRICA

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11). The observation of SA-2 equipment near Port Sudan on marked the first time a Soviet SAM system was identified in Sub-Saharan Africa. SA-2 activity has been observed at four facilities in the vicinity of Port Sudan—three launch sites and one support facility.	25 X 1
Tanzania	
15. (S/D) Tanzania has three SAM systems—the SA-3, SA-6, and the SA-7 (Table 6 and Figure 12). The first identification of both the SA-3 and the SA-6 in Sub-Saharan Africa took place when these two systems were observed in Tanzania. SA-3 equipment was in the vicinity of Dar es Salaam on The SA-3 system in Tanzania presently consists of six launch sites and one support facility. Four of the launch sites and the support facility are in the Dar es Salaam area and two additional launch sites are on Zanzibar Island.	25X1 25X1
16. (S/D) The SA-6 system was initially identified in Tanzania in January 1979, when a regiment-sized SA-6 deployment (five batteries) was observed near Dar es Salaam. By late February, most of this equipment had been moved to the northwestern portion of the country to support the Tanzanian invasion of Uganda. Four SA-6 batteries—one at Mwanza, two at Bukoba, and one at Kammengo in Uganda—were identified in this area between March and July. However, by November the SA-6 batteries had departed the northwestern portion of Tanzania and were concentrated in the vicinity of Dodoma where one deployed SA-6 site and three additional batteries of SA-6 equipment have been identified (Figure 13). In addition, SA-6 support equipment has been identified in the vicinity of Mtwara Port Facilities indicating that the fifth Tanzanian SA-6 battery may be deployed near this southern port city.	25X1
Uganda	
17. (S/D) No SAM systems have been identified with Ugandan military forces. However, on an SA-6 site was identified in southwestern Uganda just north of Kammengo (Figure 14). This site contained three SA-6 transporter-erector-launchers and was part of the Tanzanian military force that was advancing on the city of Kampala at that time.	25X1
Zambia	
18. (S/D) Three SAM systems—the Soviet SA-3 and SA-7 and the British Tigercat—have been identified in Zambia. Two Tigercat sites, each consisting of one launcher and one guidance radar, were deployed in the vicinity of Lusaka International Airfield Figures 15 and 16) from April 1979 through February 1980. No Tigercat sites were observed on coverage of Lusaka International Airfield, and the present location of the Tigercat system within Zambia is not known. On SA-3 equipment was identified for the first time in country at Lusaka International Airfield. This equipment had been removed by The present deployment of the SA-3 system within Zambia is also not known.	25X1 25X1 25X1 25X1 25X1



Table 2. SAM Facilities, Angola (Keyed to Figure 3)

This table in its entirety is classified SECRET/WNINTEL

Item Number	Installation Name BE Number	History	Present Status
1	Sa Da Bandeira SA-3 SAM Site	First observed ucor First observed occupied	Operational; 3 four-rail SA-3 launchers
2	Sa Da Bandeira SA-3 SAM Site SSE	First observed ucon First observed occupied	Operational; 3 four-rail SA-3 launchers
3	Sa Da Bandeira SA-3 SAM Site NE	First observed occupied	Operational; 3 four-rail SA-3 launchers
4	Sa Da Bandeira SA-3 SAM Support Facility	First observed occupied	Active; supports three SA-3 sites in area
5	Mocamedes Airfield*	Field-deployed site observed adjacent to runway	Abandoned
6	Mocamedes SA-3 SAM Site	First observed complete and occupied	Operational; 3 four-rail SA-3 launchers
7	Mocamedes SAM Support Facility	First observed ucon and active	Active
8	Matala SA-3 SAM Site East	First observed complete and occupied	Operational; 3 four-rail SA-3 launchers
9	Matala SA-3 SAM Site West	First observed occupied	Operational; 3 four-rail SA-3 launchers
10	Matala SA-3 SAM Site East-northeast	First observed ucon	Unoccupied; still under construction
11	Matala AW Radar** Facility West	SA-3 launch battery observed here	AW radar facility: no SA-3 equipment present

^{*}Temporary deployment area for SA-3 launch battery presently at SA-3 SAM site (item 6).

^{**}Temporary deployment area for SA-3 launch battery presently at SA-3 SAM site west (item 9).

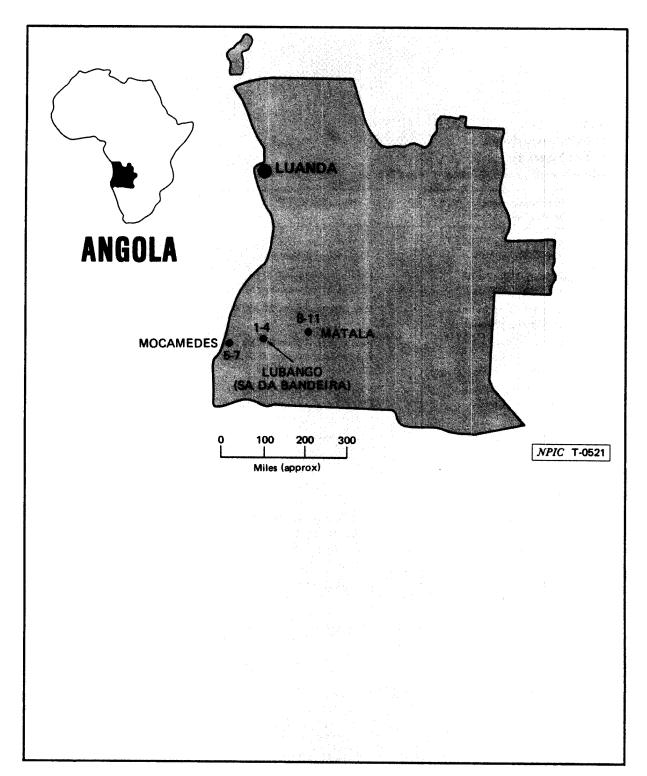


FIGURE 3. SAM DEPLOYMENT, ANGOLA

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Table 3.
SAM Facilities, Ethiopia (Keyed to Figure 4)

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This table in its entirety is classified SECRET/WNINTEL

Item Number	Installation Name BE Number	History	Present Status	
1	Aseb SA-3 Site	First observed ucon First observed occupied	Operational; 3 four-rail SA-3 launchers	25X1 25X1
2	Aseb SA-3 Site North	First observed ucon First observed occupied	Operational; 3 four-rail SA-3 launchers	25X1 25X1
3	Aseb SA-3 Site South	First observed ucon	Unoccupied	25X1 25X1
4	Aseb SA-3 Support Facility Alelao	First observed ucon First observed occupied	Active; supports the two operational SA-3 sites in the area	25X1 25X1 25X1
5	Jijiga SA-2 SAM Site	First observed occupied	Operational; six SA-2 launchers (See Figure 5)	25 X 1 25 X 1
6	Jijiga SA-2 SAM Site North	First observed complete and occupied	Operational; six SA-2 launchers	25X1 25X1
7	Diredawa SA-3 Site	First observed occupied	Operational; 3 four-rail SA-3 launchers	25X1 25X1
8	Harar Meda SA-2 Site	First observed complete and occupied	Operational; six SA-2 launchers	25 X 1
9	Addis Ababa SAM Site	First observed complete and occupied	Six SA-2 launchers	
10	Addis Ababa SAM Equipment Park	First observed occupied	Active	25X1 25X1
	Equipment I aik			25X1

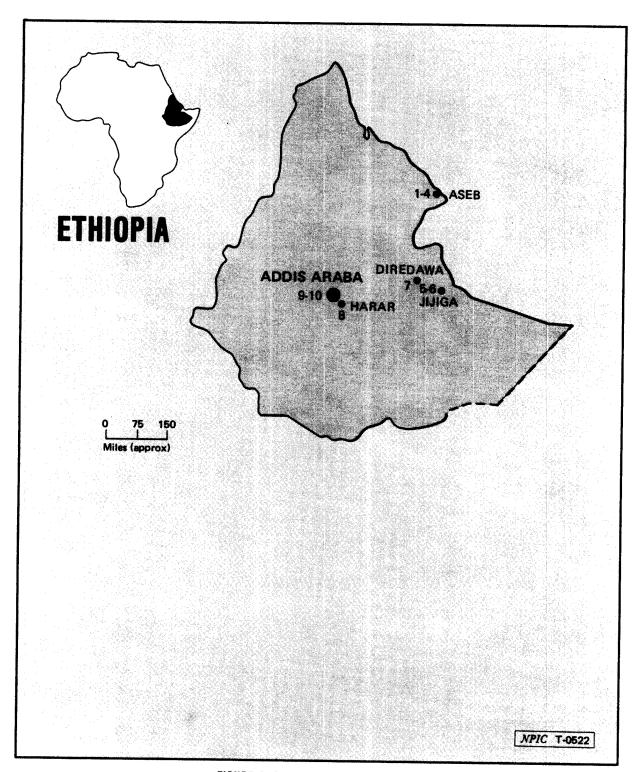


FIGURE 4. SAM DEPLOYMENT, ETHIOPIA

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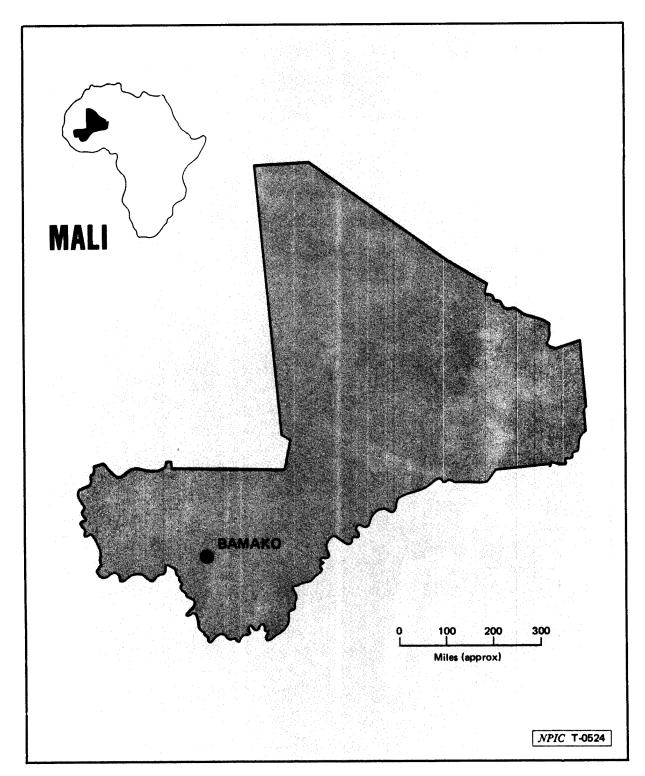


FIGURE 6. SAM DEPLOYMENT, MALI

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Table 4.
SAM Facilities, Mozambique
(Keyed to Figure 8)
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Item Number	Installation Name BE Number	History	Present Status	Remarks
1	Maputo SA-3 SAM Site	First observed ucon	Operational; 3 four-rail SA-3 launchers	
2	Maputo SA-3 SAM Site Northwest	First observed ucon	Ucon	Field-deployed SA-3 launch battery with 3 four-rail SA-3 launchers adjacent to this site; first observed
3	Maputo SA-3 SAM Site West	First observed ucon	Ucon	Field-deployed SA-3 launch battery with 3 four-rail SA-3 launchers adjacent to this site; first observed
4	Maputo SA-3 SAM Site SW	First observed complete and occupied	Operational; 2 four-rail SA-3 launchers	
5	Maputo SA-3 Missile Support Facility	Equipment first observed First construction observed	Active; supports the three operational SA-3 sites in the area	

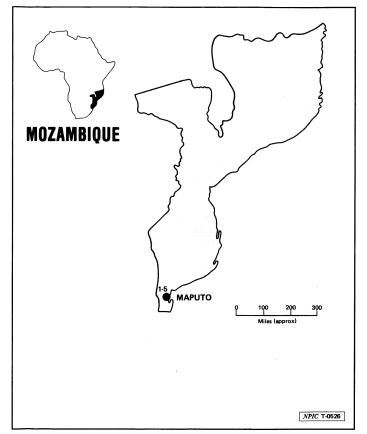


FIGURE 8. SAM DEPLOYMENT, MOZAMBIQUE

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Table 5.
SAM Facilities, Somalia
(Keyed to Figure 9)
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tem Number	Installation Name BE Number	History	Present Status	Remarks	Item Number	Installation Name BE Number	History	Present Status	Remarks
1	Berbera SA-2 Site	First observed occupied	Operational; six SA-2 launchers		13	Mogadiscio SA-2 SAM Site 6	First observed ucon	Operational; six SA-2 launchers	
2	Berbera SA-2 SAM Site	First observed occupied	Operational; six SA-2 launchers		14	Mogadiscio SA-2 SAM	First observed ucon	Operational;	
3	Berbera SA-2 SAM Support Facility	First observed ucon and occupied	Active: supports two SA-2 sites in the area			Site 7	First observed occupied	six SA-2 launchers	
4	Hargeisa SA-2 Site SW	First observed occupied	Operational; six SA-2 launchers		15	Mogadiscio SA-2 SAM Site 5	First observed ucon	Operational; 3 four-rail SA-3 launchers	SA-3 launch battery moved into this site between
5	Hargeisa SA-2 Site NW	First observed occupied	Operational; six SA-2 launchers				SA-3 equipment here		SA-2 launch battery probably redeployed to Uanle Uen SA-2 SAM Site (item 12)
6	Hargeisa SA-2 Site	First observed occupied abandoned	Abandoned	Equipment redeployed to either SA-2 Site NW (item 5) or SA-2 Site SW (item 4)	16	Mogadiscio SAM Support Facility	First observed ucon	Active; supports SA-2 and	SALA Site (Item 12)
7	Hargeisa SAM Site	First observed occupied	Abandoned	Equipment redeployed to either SA-2 Site NW (item 5) or SA-2 Site SW (item 4)			First SA-2 here	SA-3 sites in area	
8	Uanle Uen SA-3 Site	First observed occupied	Operational; 3 four-rail SA-3 launchers		17	Mogadiscio SA-2 SAM Site I	First observed ucon	Abandoned	Temporary deployment area for SA-2 launch battery presently at SA-2 SAM Site 7 (item 14)
9	Uanle Uen SA-3 Site	First observed occupied	Operational: 3 four-rail SA-3 launchers				abandoned		
10	Uanle Uen SA-2 Site	First observed ucon	Operational; six SA-2 launchers		18	Mogadiscio SA-2 SAM Site 2	First observed occupied abandoned	Abandoned	Temporary deployment area for SA-2 launch battery which occupied SA-2 SAM Site 5 (item 15)
11	Uanle Uen SAM Support Facility	First observed occupied	Active; supports SA-2 and		19	Mogadiscio SA-2 SAM Site 3	First observed occupied abandoned	Abandoned	Temporary deployment area for SA-2 launch battery presently at SA-2 SAM Site 6 (item 13)
12	Uanle Uen SA-2 SAM Site	First observed occupied	SA-3 sites in area Abandoned	Femporary deployment area for SA-2 launch battery presently at SA-2 Site (item 10)	20	Mogadiscio SA-2 SAM Site 4	First observed ucon	Abandoned	No SAM equipment ever seen here Adjacent to SA-2 SAM Site 6 & 3 (items 13 & 19)

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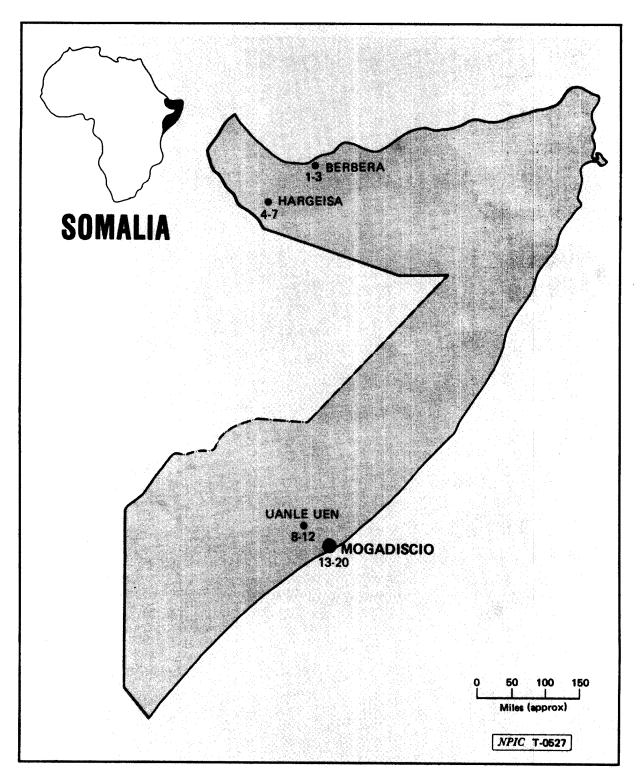


FIGURE 9. SAM DEPLOYMENT, SOMALIA

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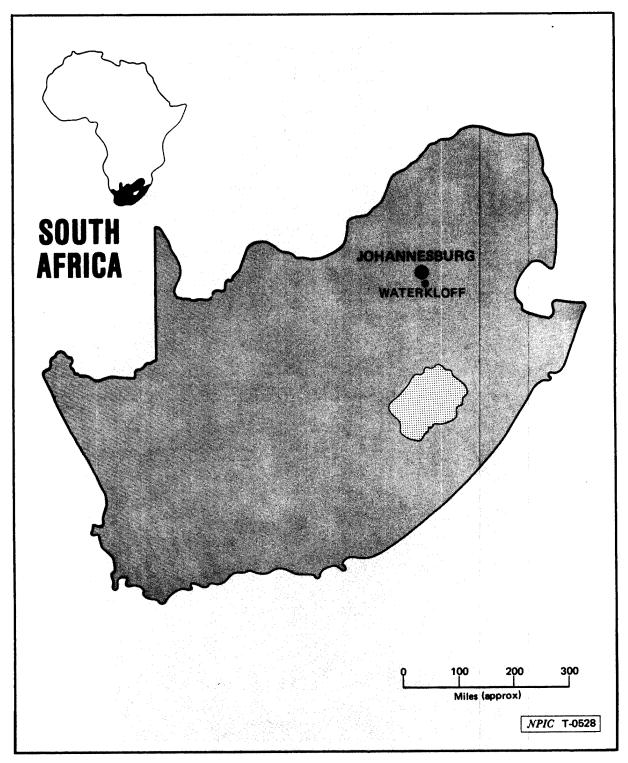


FIGURE 10. SAM DEPLOYMENT, SOUTH AFRICA

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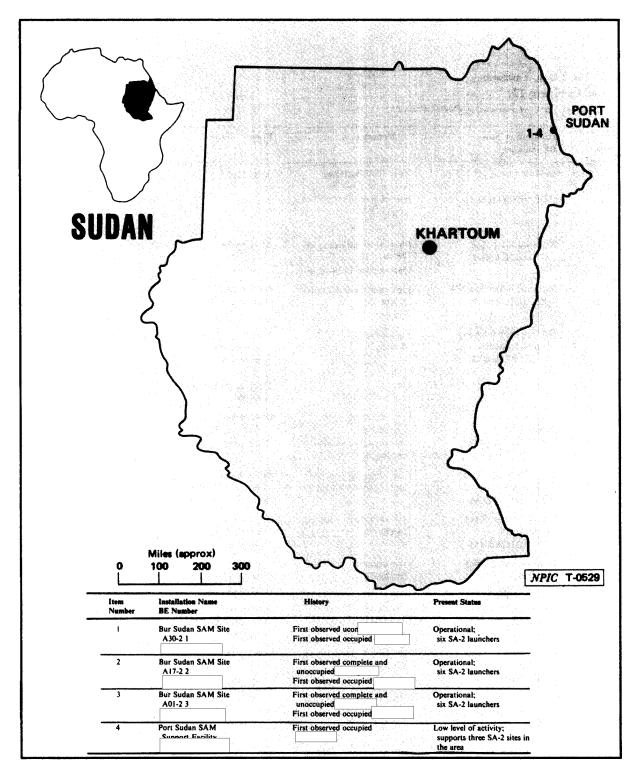


FIGURE 11. SAM DEPLOYMENT, SUDAN

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Table 6. SAM Facilities, Tanzania (Keyed to Figure 12)

This table in its entirety is classified SECRET/WNINTEL

ltem Number	Installation Name BE Number	History	Present Status	Remarks
1	Bukoba Suspect SA-6 Site	Two SA-6 batteries present No SA-6 equipment	Abandoned	No SA-6 site was observed near Bukoba SA-6 equipment here on was parked in travel mode
2	Mwanza SA-6 Site	First observed occupied Unoccupied	Abandoned	
3	Dodoma SA-6 Site NW	First observed occupied	Operational; field deployed four SA-6 TEL	
4	Dodoma SA-6 SAM Support Facility	First observed	Active; supports the SA-6 deployment in this area Three SA-6 batteries in storage	(See Figure 13)
5	Zanzibar SA-3 SAM Site	First observed ucon First observed occupied	Operational; 3 four-rail SA-3 launchers	
6	Zanzibar SA-3 SAM Site South	First observed complete and occupied	Operational; 3 four-rail SA-3 launchers	
7	Dar es Salaam SA-3 SAM Site 1	First observed occupied	Operational; 3 four-rail SA-3 launchers	
8	Dar es Salaam SA-3 SAM Site 2	First observed occupied	Operational; 3 four-rail SA-3 launchers	
9	Dar es Salaam SA-3 SAM Site 3	First observed ucon & partially occupied	Operational; 3 four-rail SA-3 launchers	
10	Dar es Salaam SA-3 SAM Site 4	First observed occupied	Operational; 3 four-rail SA-3 launchers	
11	Dar es Salaam SA-3 SAM Support Facility	First observed occupied	Active; supports three SA-3 sites in the area	SA-6 equipment observed here onirst time in Sub-Saharan Africa

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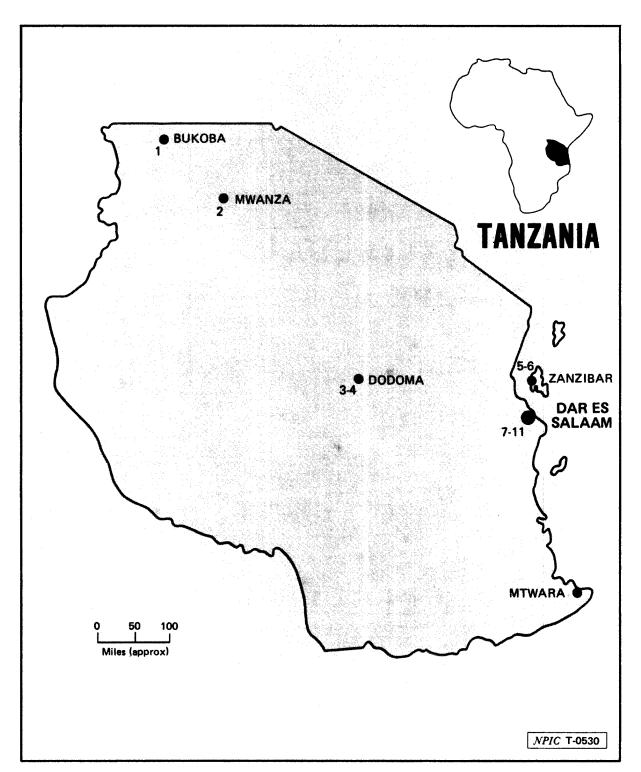


FIGURE 12. SAM DEPLOYMENT, TANZANIA

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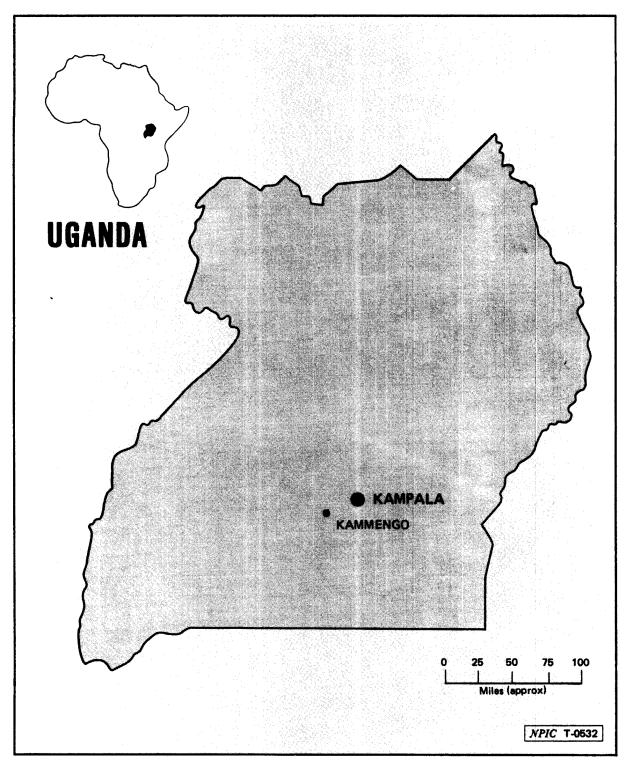


FIGURE 14. SAM DEPLOYMENT, UGANDA

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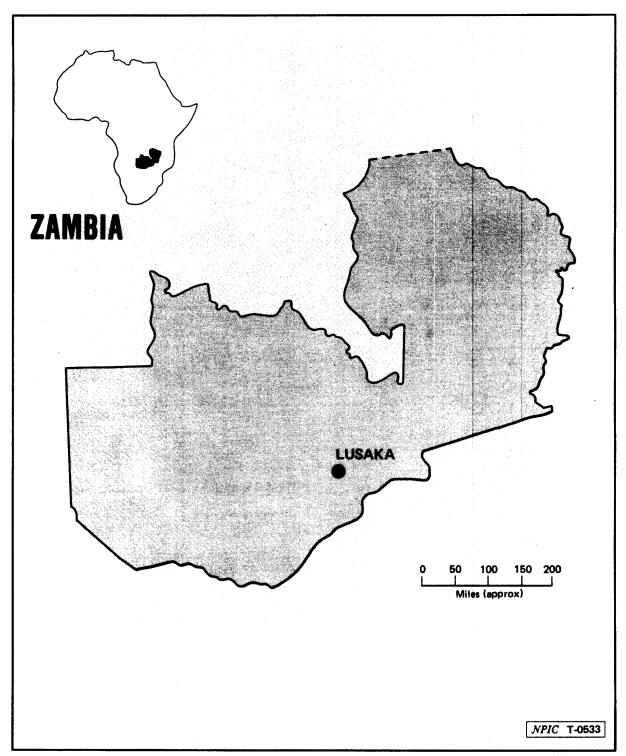


FIGURE 15. SAM DEPLOYMENT, ZAMBIA

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REFERENCES

IMAGERY		
(S/D) All available, applicable satellite imagery acquired from in the preparation of this report.	was used	25 X 1
RELATED DOCUMENT		
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(S) Comments and queries regarding this report are welcome. They may be directed to Third World Forces Division. Imagery Exploitation Group, NPIC		25 X 1

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